



IMPACT OF COMMERCIAL BANK'S CREDIT ON MANUFACTURING SECTOR OUTPUT IN NIGERIA: AN EX-POST FACTOR RESEARCH DESIGN APPROACH

El-Yaqub Ahmad. B.¹, Ibrahim Musa² and Sule Magaji³

¹Department of Economics, Faculty of Social Science, University of Abuja.

Email: ahmed.el-yaqub@uniabuja.edu.ng

²Department of Economics, Faculty of Social Science, University of Abuja.

Email: ibrahim.musa@uniabuja.edu.ng

³Department of Economics, Faculty of Social Science, University of Abuja.

Email: sule.magaji@uniabuja.edu.ng

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ABSTRACT: *This study employed an empirical analysis to investigate the impact of commercial banks' credit (CBC) on manufacturing sector output (MSO) from 1992 to 2021. The approach utilised is Ex-Post Facto Research Design. The study's findings indicated that CBC has a beneficial and substantial influence on MSO. The long-term value of CBC has a positive and substantial impact on MSO. A 1% rise in Credit to Small and Medium Businesses (CSM) led to a 0.1866% increase in MSO. Conversely, a unit increase in deposit interest rate (DINR) resulted in a 0.0081% fall in MSO. In the long run, a unit increase in Government Capital Expenditure (GOV) caused a 0.1482% increase in MSO. Therefore, through its monetary authority, the Government makes an efficient policy that allows the manufacturing sector and small and medium enterprises to access bank credit at low interest rates.*

KEYWORDS: Commercial Bank's Credit, Manufacturing Sector Output, Deposit Interest Rate, Small and Medium Businesses.

JEL Classification: D01, O12



INTRODUCTION

Manufacturing converts raw materials into final consumer items, intermediates, or partially finished products. Like other industrial endeavours, manufacturing improves agriculture, broadens the economy, and increases a nation's foreign exchange profits. Furthermore, it allows local workers to gain new expertise. Nigeria has a long-standing history of manufacturing that dates back to the pre-colonial era. The Hausa, Benin, and Ibo cultures are characterised by a decentralised social structure, with numerous small-scale producers producing items for commerce and various social activities (Charles-Anyago, Ezirim & Ezirim, 2018). The manufacturing sector is a crucial component of the contemporary economy, possessing numerous dynamic benefits for economic transformation. Kunemoemi & Robert (2020) asserted that manufacturing has been a pivotal catalyst in most developing economies. Borat, Kanbur, Rooney & Steenkamp, (2019) argue that throughout the history of economics, there are very few instances where a nation has achieved sustainable economic development without the manufacturing sector playing a leading role.

Nigeria's manufacturing industry has been severely neglected because of an overwhelming reliance on oil. Unlike the historical experiences of Britain, the US, Germany, Japan, and Russia, as well as the more recent growing economies in Asia, such as China, India, Singapore, Taiwan, and Thailand, this finally led to the country achieving homogeneity. South Korea and Malaysia, as well as Brazil and Ghana were referenced in a recent study by Obidigbo in 2012. The lack of access to industrial financing is the main reason for the minimal growth in the manufacturing sectors of Nigeria and other emerging countries. Adelegan (2011) reported that managers of firms in Nigeria are dissatisfied with the limited availability of finances and the high-interest rates, which pose substantial challenges to conducting business. Supporting this perspective, the 2011 Federal Republic of Nigeria report indicated that the quantity and quality of bank funding to the private sector declined as banks exercised greater prudence in response to the financial crisis. Insufficient finance has impeded companies from investing in vital elements such as state-of-the-art machinery, information and communication technology, and the development of human resources (Igwe, Magaji & Darma, 2021). The aspects above are crucial for cost reduction, productivity improvement, and competitive advantage enhancement (Ume, Obasikene, Oleka, Nwadike & Okoenu, 2017).

A sustainable banking system is essential to absorb poor economic conditions and financial distress, especially in economies that depend heavily on commodities, as underlined by Hasanov, Bayramli & Al-Musehel (2018). Alkhazaleh (2017) contends that the primary obligation of banks to provide credit is essential for financing all sectors of the nation. Timsina, Panta, Dangal & Chaulagain (2017) argue that credit constitutes the primary source of revenue in the portfolios of most banks, thus highlighting the significance of credit management as a primary concern. The banking systems in an economy perform crucial services that support the growth and advancement of the economy (Magaji & Aliyu, 2007), particularly in the manufacturing sector. The advancements in science and technology have resulted in increased collaboration and amalgamation of sectors within and beyond Nigeria. The increased integration of these industries is a tangible expression of this technical progress. Macroscopic economic indicators fluctuate because of external disturbances, of which no sector is exempt (Okotori, 2019).



The real value added to the economy (manufacturing) is captured through capital formation (investment), which will increase future savings, investments, and wealth creation (Musa, Magaji, Salisu & Peter, 2022). The increase in capital production leads to higher savings, which in turn has a positive impact on the accumulation of private savings (Magaji & Yahaya, 2012). As savings accumulate, gross domestic investment (GDI) increases, leading to GDP growth due to the income generated by the investment projects undertaken (Magaji, Salisu & Peter, 2022). While few empirical studies have addressed the relationship between bank credit and economic growth, Audu, Anfofum & Bilikisu (2021) and Elijah (2019) explicitly investigated the influence of bank lending on the output of Nigeria's manufacturing sector. November & John (2016) and Ogar, Nkamare, & Effiong (2014) examined the correlation between credit extended by commercial banks and the production level in the Nigerian manufacturing industry. The research was carried out by utilising data sourced from Nigeria. Hacievliyagil & Eksi (2019) examined the correlation between bank loans and economic growth, emphasising the manufacturing sub-sector. These studies focused on few analyses and are not updated.

The significant concern for commercial banks' credit and its impact on the economies of developing countries, as well as the need for economic growth and development, influenced the decision to embark on this study. The main goal of this paper is to investigate how bank lending affects the manufacturing industry in Nigeria. Specifically, the study aims to analyse the influence of loans from commercial banks on the production of the industrial sector. Additionally, it seeks to assess the impact of loans granted to the private sector on the level of MSO in Nigeria.

The study comprises several sections, including the literature review, which thoroughly examines relevant prior research and the theoretical framework. The methodology section outlines the model specification and research methods employed. The data presentation and analysis section justifies the empirical analysis of the dataset. Lastly, the conclusions section elucidates the study's findings and offers policy recommendations for various stakeholders.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Conceptual Review

Commercial Bank's Credit

Ajayi (2000) defines credit as the obligation of one party to repay another for acquiring goods and services or borrowed funds. Credit is closely intertwined with the banking sector. Banks serve as intermediaries for transferring funds from surplus units in the economy, which need money for investment, to deficit units, which get it in deposits (Eke, Osi, Sule & Musa, 2023) and (Adam, Magaji, Ayo & Musa, 2016). Consequently, banks owe money to finance depositors and creditors to finance borrowers (Okoroafor, Magaji & Eze, 2018). Bank credit refers to the aggregate sum of advances and loans provided by the banking sector to economic entities, as defined by Central Bank of Nigeria (CBN, 2003)

Collateral is frequently employed to guarantee loan repayment in the event of non-payment (Magaji, Darma & Igwe, 2021). Credit facilitates the conversion of savings into investments, hence promoting economic expansion (Chinedu, Magaji & Musa, 2021). Therefore, obtaining



credit facilitates the fulfilment of the intermediation function, which is essential for the economy's expansion (Magaji, Musa & Temitope, 2021). Nzotta's (2002) definition of bank credit is the provision of loans by a bank to a borrower, considering the potential risks and profitability of the lending decision.

Manufacturing Sector Output

According to Opaluwa, Umeh & Ameh (2010), the manufacturing sector is essential for economic development and acts as a catalyst in the modern economy, offering numerous dynamic benefits. They pointed out that the manufacturing sector is a leading sector in many ways in an advanced nation; it offers opportunities for raising employment, fostering the growth of investment at a faster rate than any other sector of the economy, expanding and improving the linkages between various sectors, and increasing productivity in relation to import substitution and export expansion. According to Obasan & Adediran (2010), the manufacturing sector presents prospects for capital accumulation when compared to agriculture in the context of industrialization. They clarified that compared to geographically distributed agriculture, capital accumulation can be realised more readily in industry that is spatially concentrated. This is among the factors that have made the rise of manufacturing so crucial to progress and expansion. It is impossible to overstate the importance of Nigeria's industrial sectors to the country's economy, both in terms of job opportunities and economic benefits, according to Obasan & Adediran (2010). They contend that in addition to providing a stable economic base and acting as an industry that can replace imports, it also serves as a ready market for intermediary goods.

Theoretical Review

To underpin this study, the Neoclassical Theory of Firm's Growth is used.

Neoclassical Theory of Firm's Growth

Although the term 'neoclassical' encompasses a large and vaguely defined body of literature, however for the purposes of our discussion on manufacturing sector growth, we consider that the main expectation emerging from the traditional neoclassical perspective is that firms are attracted to some sort of optimal size (Samuelson, Whittlesey, Seltzer, Friedman, Robinson, Hitch & Viner, 1952). This optimal size is the profit-maximising level of production, in which economies of large-scale production are traded off against the costs of coordinating large bureaucratic organisations. In this view, firm growth is merely a means of attaining this 'optimal size', and it is of no interest per se. Once firms have reached their optimal size, they are assumed to grow no more. It is relevant to mention here the well-known transaction costs theory of the firm, which began with Coase's (1937) seminal article. To summarise, this theory considers that the optimal boundaries of the firm are determined in a trade-off between the advantages of coordination via authority in a hierarchy versus the advantages of coordination through the price mechanism. If transaction costs are relatively large, then firms will find it worthwhile to expand upstream or downstream to acquire strategic assets. In this way, the production chain can be coordinated using authority in the context of a hierarchical organisation. If transaction costs are low, however, the optimal boundaries of the firm are smaller because the firm can interact with suppliers and customers via the market mechanism (Tece, 2019).



Empirical Review

Multiple empirical research has shown the specific impacts of bank lending on a country's manufacturing industry.

The study undertaken by Audu, Anfofum & Bilikisu (2021) aimed to assess the influence of bank loans on Nigeria's manufacturing sector. They were utilising a time series of secondary data from 1986 to 2017. The analysis utilised the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, together with the Autoregressive Distributed Lag (ARDL) and Granger Causality procedures. The study discovered a substantial and favourable enduring correlation between bank loans and industrial sector output, with a significance level of 1 percent. In contrast, no significant association between inflation rates and sector output was found. The investigation revealed that credit from deposit money institutions considerably impacts industrial production in Nigeria. It was found that there is a one-way causal relationship between the industrial sector and bank loans. The report suggests enhancing legislative frameworks and credit control procedures to attract investors to the industrial sector. It emphasises the need for regulatory authorities to ensure the availability of easily accessible and affordable bank loans to boost productivity in manufacturing.

Ibrahim, Abdulrahman & Abubakar (2021) analysed Nigeria's banking and manufacturing industries. An additional approach to gathering data was employed by utilising a statistics bulletin released yearly by the Central Bank of Nigeria and the World Bank database. During the investigation, the data was limited to the period from 1981 to 2019. The researchers employed Nonlinear Autoregressive Distributed Lag (ARDL) and Granger causality analysis methods to analyse the data. The conclusive test result indicates the presence of a sustained correlation between manufacturing production, bank credits, and interest rates. The results of the short-term experiment demonstrated a positive correlation between bank loans and manufacturing output, whereas, in the long term, the correlation was negative. Nevertheless, the Granger causality test revealed a one-way causality between the variables. Therefore, the study proposed that policymakers establish a more appealing interest rate ideal for investors, enabling them to borrow funds and provide job opportunities while enhancing the industrial sector's productive capacity in the economy.

Sulehri, Rana & Naem (2021) investigated the influence of commercial banks on industrial productivity in Pakistan. They focused on two specific types of productivity measures: partial productivity and total factor productivity. The study examined three independent variables: bank credit given to the industrial sector, credit from other institutions, and a statistic from the World Bank. The investigation was based on secondary time series data from 1972 to 2015. The study utilised the Augmented Dickey-Fuller (ADF) test to assess the stationarity of the data, along with supplementary diagnostic techniques to confirm the accuracy of the findings. The statistics indicate a robust and significant link between bank loans, labour force participation rate, and industrial productivity. On the other side, there is a harmful and significant relationship between the average income per person and the level of productivity in the industrial sector. Based on these findings, increasing credit to boost industrial productivity is recommended.

Ali, Nwakoby & Okonkwo (2020) examined the influence of banking sector reforms on the expansion of the manufacturing sector in emerging countries, specifically focusing on the Nigerian economy. The research investigated time series data from 1986 to 2018, derived



from the National Bureau of Statistics (NBS) and the CBN statistics bulletin. The study utilised a Dynamic Ordinary Least Squares (OLS) methodology to examine the correlation between the banking sector, manufacturing sector, and overall economic growth. The Augmented Dickey-Fuller (ADF) test was used to determine the presence of a unit root, while the Johansen Cointegration test was employed to assess Cointegration. The results demonstrated a strong correlation between the model and the data, with a coefficient of determination of 61%, indicating a significant association.

Furthermore, the results demonstrated that there was no serial correlation present in the model. The administration was recommended to develop novel, effective fiscal and monetary measures to enhance macroeconomic stability. Additionally, it is imperative to advocate for structural reform initiatives to enhance Nigeria's banking and manufacturing sectors.

In their study, Nwabuisi, Oke-Bello, Oyewole, Toriola, Folani & Afolabi (2020) examined the influence of bank loans on the efficiency and effectiveness of Nigeria's manufacturing industry. The researchers employed the DOLS model and an ex-post facto study design to examine the independent factors of bank credit, interest rates, and exchange rates and their impact on the dependent Variable of industrial production. Upon analysing the yearly time series data spanning from 1981 to 2017, it was found that bank credit and interest rates had a noteworthy beneficial influence on the performance of the industrial sector. Conversely, the exchange rate had a considerable negative impact. The study suggested that government assistance should be implemented to decrease interest rates and encourage lending.

A study undertaken by Akinola, Efuntade & Efuntade (2020) examined the impact of bank funding on the growth of Nigeria's industrial sector. The researchers employed a linear regression model and the ordinary least square approach to evaluate the influence of domestic money supply, bank credit, and maximum bank lending rates on the performance of the industrial sector. The results revealed a robust and positive correlation between bank loans, the amount of money circulating within the country, and the expansion of the industrial sector.

In addition, Okere, Cletus & Ugonma (2020) utilised an Autoregressive Distributed Lag (ARDL) methodology to examine the correlation between bank credits and the production of the industrial sector in Nigeria. The study analysed time series data spanning from 1981 to 2018. Their investigation found a clear correlation between commercial bank credit allocated to the manufacturing sector and interest rates. The augmentation of bank credit resulted in a short-term surge in manufacturing production, whereas an escalation in interest rates had a comparable impact. The study highlighted the necessity of implementing long-lasting laws, particularly in the banking sector, to facilitate the provision of credit to the manufacturing and other sectors of the Nigerian economy.

Hacievliyagil & Eksi (2019) conducted a study to examine the correlation between bank loans and the growth and performance of different manufacturing sub-sectors. The focal point of this examination is the industrial production index. The study utilised the ARDL model and a bound cointegration test to establish the association. The data suggest that a boost in bank lending to all sub-sectors leads to a proportional increase in industrial output, except for the machinery sub-sector. The Toda Yamamoto causality test identified different degrees of causation in all sub-sectors, except the machinery and chemical sub-sectors. The study



revealed causal relationships between different parameters, including loan interest rates and industrial productivity.

Yusuff & Akinyele (2019) examined the correlation between the production of manufacturing companies and the loans they receive from banks in Nigeria. The researchers utilise cointegration and vector error correction methodologies to analyse data from 1986 to 2016. The study suggests a consistent and enduring correlation between market capitalisation, bank lending, and manufacturing business production. The studies also indicate a negative link between bank loans and manufacturing production. However, a distinct association was observed between the output of manufacturing enterprises and many characteristics, including manufacturing output, market capitalisation, real gross domestic product, real exchange rate, and real interest rate. Moreover, a negative association concerning market capitalisation has been discovered between industrial production and bank loans.

METHODOLOGY

This study employed an ex-post facto research technique to illustrate the causal influence of the explanatory variables on the dependent variable using multiple regression analysis. In addition, this analysis utilised secondary time series data from the CBN (2021) series, covering the period from 1992 to 2021.

MODEL SPECIFICATION

This study adapted the research model of Magaji & Musa (2023) to examine the comparative influence of loans provided by commercial banks on Nigeria's manufacturing sector production between 1992 and 2021.

According to their model,

$$RGDP = f(CBC, DPI, GCE, \mu) \dots\dots\dots 3.1$$

$$RGDP = \alpha + \beta CBC + \lambda DPI + \delta GCE + \mu \dots\dots\dots 3.2$$

Where:

RGDP = Real GDP (proxy for real sector),

CBC = Commercial Bank Credit,

DPI = Domestic Private Investment,

GCE = Government Capital Expenditure,

α = Intercept of Drift term;

The slope parameters β , θ , and δ represent the specific influence of the explanatory factors on the 14 regress. The variable μ functions as the residual term, encapsulating any other factors that impact the regressor variable but have been excluded from this regression equation. This study revised its model by removing DPI and Real Gross Domestic Product (RGDP) and substituting them with loans extended to small and medium-sized enterprises (CSM) and



DINR. This study uses RGDP as a substitute for the real sector, specifically the manufacturing output sector. The other elements are considered explanatory variables.

$$MSO = f(CBC, CSM, DINR, GOV) \dots\dots\dots 3.3$$

The model's functional relationship described above can be converted to econometric form as shown below:

$$\log MSO = \alpha_0 + \alpha_1 \log CBC + \alpha_2 \log CSM + \alpha_4 \log GOV + \mu \dots\dots 3.4$$

Where:

MSO = Manufacturing Sector Output in Naira (Billions)

CBC = Commercial Bank Credit in Naira (Billions)

CSM = Credit to Small and Medium Businesses in Naira (Billions)

DINR = Deposit Interest Rates in Naira (Billions)

GOV = Government Capital Expenditure in Naira (Billions)

α_0 = Constant parameter

$\alpha_1 - \alpha_4$ = Slope parameters

μ = error term.

RESULT AND DISCUSSIONS

DESCRIPTIVE STATISTICS

Table 4.1

| | MSO | CBC | CSM | DINR | GOV_ |
|---------------------|------------|------------|------------|-------------|-------------|
| Mean | 51217.62 | 6961.507 | 38.52589 | 10.98459 | 783.3050 |
| Median | 32525.56 | 3714.993 | 36.60940 | 10.19833 | 602.9974 |
| Maximum | 176075.5 | 22026.37 | 123.9321 | 23.24167 | 3129.890 |
| Minimum | 906.0293 | 75.45630 | 10.74789 | 4.206848 | 39.76330 |
| Std. Dev. | 52804.62 | 7126.120 | 28.06934 | 4.093402 | 713.4873 |
| Skewness | 0.878370 | 0.578344 | 1.237810 | 0.809906 | 1.601847 |
| Kurtosis | 2.564705 | 1.928519 | 4.199759 | 4.083813 | 5.498015 |
| Jarque-Bera | 4.094520 | 3.107497 | 9.460147 | 4.748048 | 20.62967 |
| Probability | 0.129088 | 0.211454 | 0.008826 | 0.093105 | 0.000033 |
| Sum | 1536528. | 208845.2 | 1155.777 | 329.5377 | 23499.15 |
| Sum Sq. Dev. | 8.09E+10 | 1.47E+09 | 22848.74 | 485.9223 | 14762860 |
| Observations | 30 | 30 | 30 | 30 | 30 |



Source: *Researcher's Compilation from Eviews 10, 2023*

Table 4.1 presented the precise descriptive statistics of the retrieved data sample. The computed statistical measures include the Mean, Median, Standard Deviation, Skewness, Kurtosis, Jarque-Bera, and Probability. Furthermore, the total number of observations amounts to 30. The data include MSO, CBC, CSM, DINR, and GOV. The MSO, CBC, and series' DINR values demonstrate a normal distribution, as evidenced by a Jarque-Bera probability value over 0.05. However, the CSM and GOV series do not follow a normal distribution since their Jarque-Bera probability values are less than 0.05. In addition, MSO and CBC display a platykurtic distribution characterised by a Kurtosis value below 3, whereas CSM, DINR, and GOV display a leptokurtic distribution. Lastly, the standard deviation of manufacturing sector output from the mean is more significant than commercial bank credit. This suggests that expanding the industrial sector's production directly results from Nigeria's continuous growth of bank credit flow.

Unit Root Test

Stationarity Test

Table 4.2: Augmented Dickey-Fuller Test

| Variables | ADF Test Statistic | 5% Critical Value | Order | Remarks |
|-----------|--------------------|-------------------|-------|------------|
| LogMSO | -3.9366 | -3.5806 | I[1] | Stationary |
| logCBC | -3.5748 | -3.5806 | I[1] | Stationary |
| logCSM | -5.4035 | -2.9718 | I[1] | Stationary |
| DINR | -3.5864 | -3.5742 | I[0] | Stationary |
| logGOV | -6.2480 | -3.5806 | I[1] | Stationary |

Source: *Researcher's Compilation from Eviews 10, 2023.*

The Augmented Dickey-Fuller unit root test, as shown in Table 4.2, concluded that the data series for MSO, CBC, CSM, and GOV were stationary at first difference, indicating that they were integrated of order one, I(1), with a significance level of 5 percent. Conversely, the Deposit Interest Rates (DINR) stayed steady, categorised as integrated of order zero, I(0). Once the variables are stationary, the following step is to estimate the parameters of the model in order to determine their influence on the dependent Variable. Therefore, this study will employ the ARDL strategy, as it is the suitable estimation technique for variables with different levels of stationarity. The VAR Lag Order Selection Criteria will be utilised to determine the appropriate lag order for the ARDL Bound test for Cointegration.

Optimal Lag Selection Criteria

Table 4.3

| Lag | Login | LR | FPE | AIC | SIC | HQ |
|-----|-----------|-----------|-----------|-----------|-----------|-----------|
| 0 | -40.05404 | NA | 1.72e-05 | 3.218146 | 3.456039 | 3.290872 |
| 1 | 78.40556 | 186.1508 | 2.24e-08 | -3.457540 | 2.030178* | -3.021182 |
| 2 | 112.8947 | 41.87965* | 1.38e-08* | 4.135335* | -1.518505 | 3.335344* |



Source: *Researcher's Compilation from Eviews 10, 2023.*

The appropriate lag length for the model is determined in the first step of the ARDL procedure using the Akaike Information Criterion approach of the restricted VAR estimate. A delay of 2 was employed, as shown in Table 4.3.

ARDL Long Run Bound Test

Table 4.4 F-Bounds Test

Null Hypothesis: No Relationship

| Test Statistic | Value | Significance Level | I(0) | I(1) |
|----------------|---------|--------------------|------|------|
| F-statistic | 10.7784 | 10% | 2.2 | 3.09 |
| K | 4 | 5% | 2.56 | 3.49 |
| | | 2.5% | 2.88 | 3.87 |
| | | 1% | 3.29 | 4.37 |

Source: *Researcher's Compilation from Eviews 10, 2023.*

Table 4.4 confirms the enduring presence of the factors in the long term. The ARDL Bounds cointegration study revealed a significant long-run link among the variables, as indicated by the F-statistics exceeding the lower and upper-class boundaries at significance levels of 1%, 2.5%, 5%, and 10%.

ARDL Regression Output

Table 4.5

Dependent Variable: logMSO

ARDL (1,1,1,1,2)

| Variable | Coefficient | Std. Error | t-Statistic | Probability |
|---------------------|-------------|------------|-------------|-------------|
| LOGMSO(-1) | 0.4877 | 0.1347 | 3.6198 | 0.0021 |
| LOGCBC | 0.1846 | 0.1228 | 1.5037 | 0.1510 |
| LOGCBC(-1) | 0.3783 | 0.1359 | 2.7836 | 0.0127 |
| LOGCSM | 0.1224 | 0.0426 | 2.8676 | 0.0107 |
| LOGCSM(-1) | 0.0642 | 0.0362 | 1.7745 | 0.0939 |
| DINR | -0.0020 | 0.0029 | -0.6959 | 0.4959 |
| DINR(-1) | -0.0061 | 0.0031 | -1.9234 | 0.0713 |
| LOGGOV | -0.1201 | 0.0607 | -1.9797 | 0.0642 |
| LOGGOV(-1) | -0.0734 | 0.0588 | -1.2475 | 0.2291 |
| LOGGOV(-2) | -0.1491 | 0.0521 | -2.8619 | 0.0108 |
| C | 1.1204 | 0.2459 | 4.5550 | 0.0003 |
| R-squared | 0.9983 | | | |
| Adjusted R-squared | 0.9973 | | | |
| F-statistic | 1033.338 | | | |
| Prob(F-statistic) | 0.0000 | | | |
| Durbin-Watson stat. | 1.7153 | | | |

Source: *Researcher's Compilation from Eviews 10, 2023.*



The ARDL analysis, as shown in Table 4.5, indicates that the variable of interest is statistically significant at a 5% level. This is obvious from the probability value of Prob < 0.05. On the other hand, if the probability value is more significant than 0.05, the variable is not deemed to have statistical significance at that level. Table 4.5 displays the F-statistics, which measure the overall significance of the variables. The F-statistics value is 1033.338, with a probability value of 0.0000. This suggests that the model is highly successful and robust. The R-squared and its adjusted form measure the coefficient's level of determination, evaluating the model's quality. The R-squared value was 0.9983, while the Adjusted R-squared value was 0.9973. The statement suggests that the alterations in the independent variables can explain 99% of the variations in RGDP. Therefore, the model demonstrates an exact alignment. The Durbin-Watson score of 1.7153 suggests a positive serial correlation in the model.

ARDL Long Run Test

Table 4.6 Long Run Test

| Variable | Coefficient | Std. Error | t-Statistic | Probability |
|------------|-------------|------------|-------------|-------------|
| LOGCBC(-1) | 0.562987 | 0.134991 | 4.170553 | 0.0006 |
| LOGCSM(-1) | 0.186657 | 0.047412 | 3.936914 | 0.0011 |
| DINR(-1) | -0.008154 | 0.004228 | -1.928566 | 0.0707 |
| LOGGOV(-1) | -0.342725 | 0.083456 | -4.106643 | 0.0007 |
| C | 2.1873 | 0.2496 | 8.7624 | 0.0000 |

Source: *Researcher's Compilation from Eviews 10, 2023.*

The long-term relationship is illustrated in Table 4.6, using the MSO as the dependent Variable. The CBC has a favourable and statistically significant impact on Nigeria's manufacturing sector production performance over a lengthy period, specifically after lag1. An increase of 1% in CBC is linked to a corresponding increase of 0.5629% in MSO. Similarly, the short-term output (ECM) indicates that the current value of CBC had a statistically significant impact at the 5 percent significance level (P-value 0.0168) (refer to Table 4.7).

ARDL Error Correction Model

Table 4.7 ECM Output

| Variable | Coefficient | Std. Error | t-Statistic | Probability |
|---------------|-------------|------------|-------------|-------------|
| D(LOGCBC) | 0.1846 | 0.0696 | 2.6510 | 0.0168 |
| D(LOGCSM) | 0.1224 | 0.0276 | 4.4315 | 0.0004 |
| D(DINR) | -0.0020 | 0.0017 | -1.1448 | 0.2681 |
| D(LOGGOV) | -0.1201 | 0.0435 | -2.7575 | 0.0135 |
| D(LOGGOV(-1)) | 0.1491 | 0.0384 | 3.8738 | 0.0012 |
| CointEq(-1)* | -0.5122 | 0.0559 | -9.1483 | 0.0000 |

Source: *Researcher's Compilation from Eviews 10, 2023.*

The results of the Error Correction Model in the short run, about the impact of bank lending on the manufacturing sector in Nigeria, are presented in Table 4.7. An error correction model regression was performed to determine if there is a short-term relationship between the series.



The ECT coefficient is significant because it can reflect the error term's direction and statistical importance. This phrase refers to the model's capacity to revert to a stable equilibrium state rapidly following temporary disturbances. The ECTt-1 was statistically significant at a 1% level, with a feedback coefficient of -0.5122. This coefficient suggests a moderate pace of 51.22% for correcting disequilibrium and periodically reaching a long-run equilibrium steady state position. Therefore, it indicates that the endogenous variables are moving towards a state of balance.

Diagnostic Test

Table 4.8

| Test Statistics | LM Version | |
|---|--------------------|-----------------------------|
| Serial Correlation (Breusch-Godfrey) | Obs.R-sqd = 1.0678 | Prob. $\chi^2(1)$ = 0.3014 |
| Heteroscedasticity (Breusch-Pagan Godfrey) | Obs.R-sqd = 8.6068 | Prob. $\chi^2(10)$ = 0.5698 |
| Normality (Jarque Bera) | 0.7003 | Prob. = 0.7045 |

Source: *Researcher's Compilation from Eviews 10, 2023.*

According to the data presented in Table 4.8, the ARDL model being examined passes all diagnostic tests with success. The diagnostic assessment shows that concerns regarding serial correlation and heteroscedasticity do not influence the ECT residual estimate, as the Probability of obs*R2 is greater than 5% in both circumstances. In addition, the test confirms that the estimated residuals follow a normal distribution, as indicated by the results of the Jarque Bera test.

RESULT INTERPRETATIONS

The statistical research demonstrates a significant and favourable correlation between the credit extended to small and medium enterprises (SMEs) and the MSO in Nigeria. This link is valid over a lengthy period and has a statistically significant degree of significance at the 1 percent level. According to Table 4.6, a 1% increase in CSM leads to a 0.1866% increase in MSO. Table 4.7 demonstrates that the ECM regression indicates a robust and statistically significant positive relationship between CSM and the manufacturing sector's production. This correlation is highly significant at a 1 percent level of significance.

Table 4.6 presented the results of a long-term study, indicating a statistically significant negative correlation between the current value of the DINR and the economy. The significance level is set at 10 percent. An increase or drop of 1 unit in DINR will lead to a corresponding decrease of 0.0081% in MSO. In the same way, the findings of the ARDL short-run analysis in Table 4.7 demonstrate an inverse relationship between the interest rate and MSO. A change of 1 unit in the DINR will decrease 0.002% in the manufacturing sector's output. The magnitude of the t-statistic (1.1445) supports the acceptance of the null hypothesis at a 10 percent significance level. This indicates that the influence of deposit interest rates in bank deposits on the manufacturing sector's output is insignificant.



The ARDL long-run regression analysis shows a strong negative correlation between GOV and MSO in the long run. The link becomes significant after a one-period delay. However, there was a clear link between government spending on capital and the output of the manufacturing industry in the short term after a single delay. A 1% increase in the Gross Production Value (GOV) results in a corresponding 0.1482% increase in manufacturing sector production. The null hypothesis is rejected with a high level of confidence ($p < 0.01$) and a small probability of 0.0012 (see Table 4.7).

DISCUSSION AND POLICY IMPLICATIONS

The results of Okere, Cletus, and Ugonma's (2020) study support the correlation between the performance of the manufacturing industry and the provision of credit by commercial banks, as well as credit extended to firms in Nigeria. Their findings indicate that bank financing exerts a substantial and favourable influence on manufacturing. However, Ume, Obasikene, Oleka, Nwadike & Okoyeuzu (2017) discovered that while there is a positive correlation over an extended period, it lacks statistical significance. The short-run analysis provides additional support for this theory, as it reveals a positive correlation between bank loans and output in the manufacturing sector. Therefore, this result indicates that bank loans and credit have a vital impact on bolstering Nigeria's industrial sector through the facilitation of efficient and robust production.

The presence of the negative sign suggests that the deposit interest rate in Nigeria has a restricted capacity to elucidate the country's industrial production in the immediate period. The impact of savings on the banking business is negligible, as seen by the correlation between reduced savings and inefficient interest rates on deposits and funds. November and John (2017) conducted research that revealed a negative association between interest rates and industrial output.

The government's allocation of funds towards infrastructure projects, such as seaports, power, roads, and bridges, as measured by the GOV, indicates the government's need to reconsider its capital expenditure to improve efficiency. Alternatively, if the government does not allocate sufficient funds to the real sector, it may hinder manufacturing and lead to a decline in Nigeria's sector production.

CONCLUSION AND RECOMMENDATIONS

This study investigates the influence of banking sector credits on the industrial sector in Nigeria. It expands upon the existing empirical framework in the literature by including additional economic factors at the province level, such as manufacturing sector production, commercial bank lending, loans to small and medium firms, deposit interest rates, and government capital expenditure and utilising a yearly dataset spanning 30 years in Nigeria from 1992 to 2021.

The results of this study suggest that bank lending, including commercial bank credit and loans to private firms, has a substantial influence on the manufacturing sector's production in Nigeria, both in the short and long run. The monetary authority can actively implement



monetary policy to support the manufacturing sector. The deposit interest rate directly impacts the loan availability for the economy's manufacturing sector, consistent with prior research findings. Augmenting one's revenue to be deposited will ultimately elevate the accessibility of credit. This occurs due to the elevated deposit, increasing the demand for money. Nevertheless, the results of this study indicated a detrimental correlation with the manufacturing industry. The cause may be a need for more efficiency in the savings rate.

In addition, this study recorded an extraordinary increase in government capital expenditure. The analysis revealed that government capital expenditures had a detrimental impact on the manufacturing sector's output in the long term. Various explanations have been provided to elucidate the adverse yet substantial impact of government expenditures on the long-term development of the Nigerian economy. Nevertheless, the government's impact (GOV) was both favourable and statistically significant in the immediate term. This suggests a growing recognition of the value of capital expenditure, leading to the Government becoming increasingly important soon.

The study recommended that through its monetary authority, the government should make an efficient policy that provides the manufacturing sector and small and medium enterprises with opportunities and easy access to bank credits and loans at a subsidised rate. Policymakers should create appropriate regulations to strengthen the two-way influence between the banking industry, where investable capital is obtained, and the manufacturing sector, which produces goods and services. Utilising borrowed money effectively and efficiently is essential if the stated goals of investment, productivity, and economic growth are to be met. There is a need for the monetary authority to revisit the deposit and saving levels of Nigerians critically. An efficient and effective policy to improve the maximum deposit interest rate should be made, and the Government should make sure that money allocated for capital projects is used wisely, that corruption is never tolerated, and that contractors use high-quality materials when building social infrastructure.

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